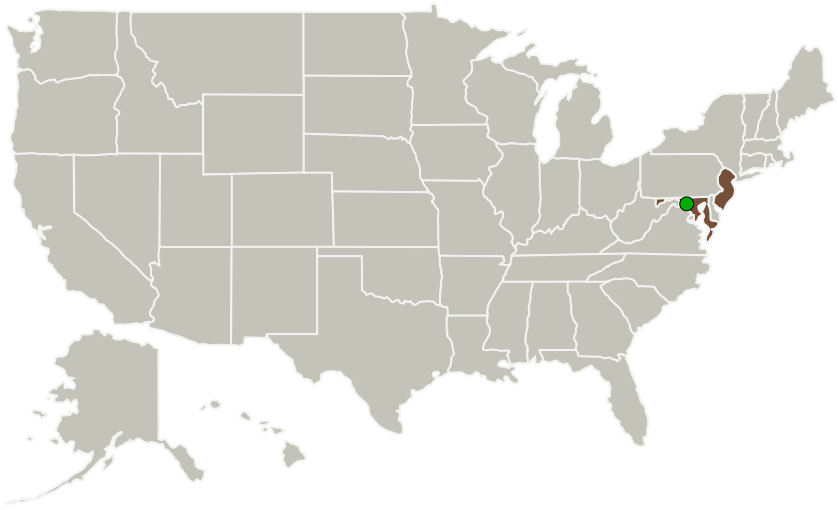
ZnMgO Nanowire Based Detectors and Detector Arrays, Phase II

Completed Technology Project (2015 - 2018)

Project Introduction

In this SBIR Program, Structured Materials Industries, Inc. (SMI) and partners are developing ultraviolet (UV) photodetection devices with high sensitivity, low noise and fast response time. The technical approach is based on nanowires of the wide bandgap semiconductor ZnMgO. The resulting devices will be blind to solar radiation, and have a tunable cut-off frequency which can be adjusted by the Mg content. The resulting photodetection devices will also be low-cost, and compatible with a wide range of device materials, including silicon substrates and silicon integrated circuitry. During Phase I, the SBIR team demonstrated technical feasibility of a simple process for fabricating the photodetectors from vertically aligned arrays of nanowires. These Phase I achievements enable low cost production of nanowire based photodetection devices, using standard microelectronic techniques. The Phase I results will ultimately enable high volume production of nanowire devices, on large area substrates, and enable integration with other microelectronic circuitry.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Structured Materials Industries, Inc.	Lead Organization	Industry	Piscataway, New Jersey
Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

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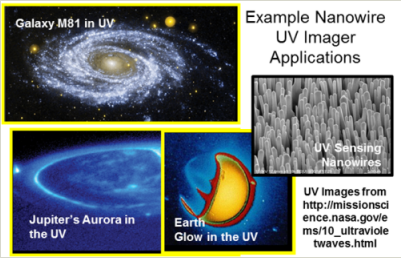
Primary U.S. Work Locations	
Maryland	New Jersey

Images



Briefing Chart
ZnMgO Nanowire Based Detectors and Detector Arrays Briefing Chart *(https://techport.nasa.gov/image/133609)*

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Structured Materials Industries, Inc.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Nick Sbrockey

Co-Investigator:
Nick Sbrockey

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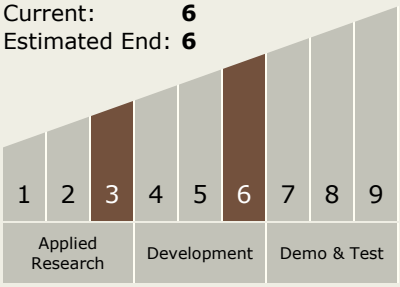
Technology Maturity (TRL)

Start: **3**
Current: **6**
Estimated End: **6**



Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.1 Detectors and Focal Planes

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System